Cardiac hybrid imaging with high-speed single-photon emission computed tomography/CT camera to detect ischaemia and coronary artery obstruction

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A 48-year-old female patient (body mass index 33 kg/m^2) without known coronary artery disease was treated over several weeks for prolonged episodes of back pain unrelated to physical activity. Due to the persistence and progression of symptoms the patient was evaluated for suspected coronary artery disease. Blood test (cardiac enzymes) as well as physical exercise test was negative but ECG at rest revealed signs of anterior non-Q-wave infarction. Therefore, the patient was referred for further non-invasive comprehensive cardiac evaluation by contrast enhanced low-dose (prospective ECG-triggering) computed tomography coronary angiography (CTCA) combined with rest/stress myocardial perfusion single-photon emission computed tomography (SPECT). This was performed on a new dedicated cardiac SPECT/CT hybrid scanner (Discovery NM/CT 570c; GE Healthcare, Milwaukee, Wisconsin, USA) integrating the latest generation gamma camera using ultrafast semiconducting cadmium zinc telluride pinhole detectors with a 64-slice CT device.

The hybrid images revealed a partially reversible anteroapical perfusion defect (figure 1, panels A and B), caused by total occlusions of the proximal left anterior descending coronary artery and of a diagonal branch (figure 1, panel C). Coronary angiography confirmed these findings (figure 1, panel D), and the patient was re-canalised in the same session.

This case illustrates the advantages of using a high-speed cadmium zinc telluride SPECT/CT hybrid scanner that allows a combined morphological and functional assessment in one session with minimised effective radiation dose (3 mSv for CTCA and 2/6 mSv for stress/rest SPECT) and shortened scan time (total SPECT/CTCA acquisition time below 15 min), demonstrating the importance and the ease of performing comprehensive non-invasive tests in low to moderate pretest probability patients.

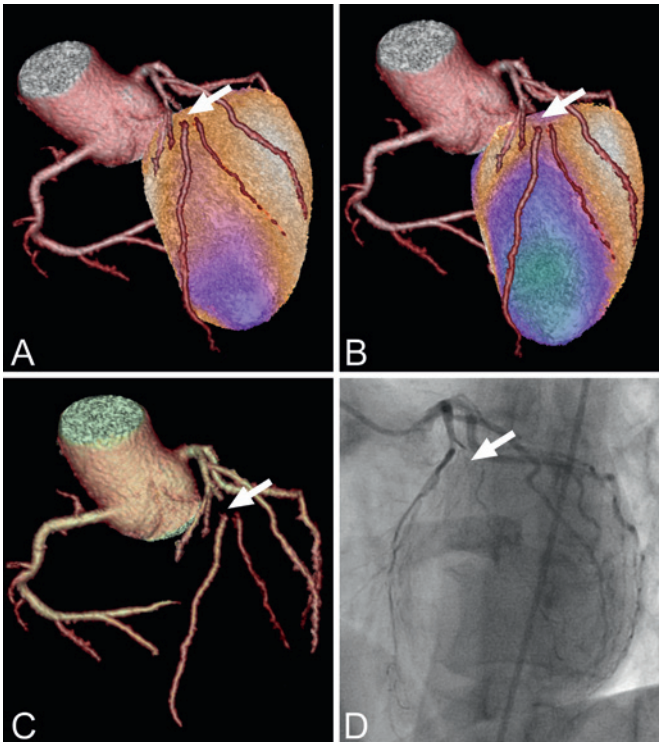

Figure 1

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Competing interests None to declare.

Patient consent Obtained.

Ethics approval This study was conducted with the approval of the local ethics committee University Hospital Zurich.

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